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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/589,439

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Ren-Hua Jin

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EXAMINER

HARRIS, GARY D

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

03/30/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/589,439	Applicant(s) JIN ET AL.	
	Examiner GARY D. HARRIS	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "aggregating and aggregation" in claim 8 is a relative term which renders the claim indefinite. The term "aggregating and aggregation" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Aggregate has more than one meaning. It can mean constituting or amounting to a whole, and composed of a mixture of minerals separable by mechanical means. Applicant's specification does not provide guidance to how the terms should be interpreted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith WO 01/27368 and further in view of Sakai et al. US 5,750,258.

As to Claim 1, Smith discloses an organic-inorganic hybrid nanofiber (See under technical field, Line 9-10). The nanofibers are crystalline polymer filaments made of a polymer having a straight-chain polyethyleneimine skeleton (linear polyethyleneimine) (See abstract and summary of invention).

Smith is silent to silica covering said crystalline polymer filament.

However, Sakai et al. US 5,750,258 discloses a crosslinked resin-coated silica fine particle using a vinyl-silane coupling agent (see abstract). The vinyl-containing silane coupling agent is made of a silane portion (alkoxysilane similar to applicants disclosure) while using polyethyleneimine as a dispersion stabilizer (Col. 13, Line 37-40). The crosslink coated silica is suitable for controlling the thickness of a liquid crystal layer (crystalline polymer)(Col. 1, Line 6-10). Additionally, using silica allows for improved properties including high hardness and strength (Col. 3, 4, Line 66-67, 1-12).

It would have been obvious to one of ordinary skill in the art to modify Smith using silica covering in order to control the thickness of the polymer filament. One would have been motivated to use a silica covering in order to improve the hardness and the strength of the material being coated. One of ordinary skill would recognize that using a silica covering would provide the attributes of a composite (more than one type of material).

As to Claim 2. Smith discloses the polymer is a straight-chain polyethyleneimine skeleton is in the form of a line, a star, or a comb (fibers are rendered insoluble when crosslinked) (Page 4, Line 31-32).

As to Claim 3. Smith discloses the nanofiber straight-chain polyethyleneimine skeleton is composed of a block copolymer (grafter) between a straight-chain polyethyleneimine block and other blocks. (Bis-epoxide is used as a crosslinking agent and becomes a resident of the fiber upon curing, see Page 7, Line 24-30)

As to Claim 4, Smith discloses the organic-inorganic hybrid nanofiber proportion of the polyethyleneimine skeleton in said polymer having the straight-chain polyethyleneimine skeleton is typically 1 to about 25 percent by weight mixed with bis-

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epoxide in ethanol and then electorspun into the desired fibers. The bis-epoxide is a crosslinking agent and becomes a resident within the fiber upon curing (Page 7, Line 24-30). The fibers produced have secondary amine sites and are compatible with textile fabrics (Page 7, Line 31-36). These nanofibers can be used as blended coverings. When only a few percent by weight of the nanofibers are used most of the surface area of a fabric will still have nanofibers (Page 7, Line 31-36).

Smith is silent with regard to the polyethyleneimine skeleton is not less than 25% by mol.

However, Smith discloses the polyethyleneimine skeleton in said polymer having the straight-chain polyethyleneimine skeleton is typically 1 to about 25 percent by weight mixed with bis-epoxide in ethanol and then electorspun into the desired fibers. The bis-epoxide is a crosslinking agent and becomes a resident within the fiber upon curing (Page 7, Line 24-30). The fibers produced have secondary amine sites and are compatible with textile fabrics (Page 7, Line 31-36). These nanofibers can be used as blended coverings. When only a few percent by weight of the nanofibers are used most of the surface area of a fabric will still have nanofibers (Page 7, Line 31-36).

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It would have been obvious to one skilled in the art to change the mol percentage of the polyethylene skeleton in order to allow a cross linking agent to become a resident of the fibers. One would have been motivated to change the mol percentage to allow the polymer to allow for a degree of curing. One of ordinary skill would have recognized that changing the mol percentage would allow for the nanofibers to be easily blended. Additionally, one skilled in the art would change the mol percentage as this would be a result effective variable. As the mol percentage increases the number of crosslinking cites on the molecule will increase. See MPEP 2144.05 [R-5].

As to Claim 5, Smith is silent in regards to the organic-inorganic hybrid nanofiber wherein an amount of the silica included is in a range of from 30 to 90% by weight.

As to Claim 6, Smith discloses the organic-inorganic hybrid nanofiber has a diameter thereof is in a range of from 100 to 1,000 nm (1 micron) (Page 1, Line 8).

As to Claim 7, Smith discloses the organic-inorganic hybrid nanofiber has a diameter of said crystalline polymer filament (polymer itself) in a range of from 100 nm to 1 micron, overlapping applicants range (Page 7, Line 1-2).

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As to Claim 8, Smith is silent in regards to the organic-inorganic hybrid structure formed by mutually aggregating (mixture of minerals separated) the organic-inorganic hybrid nanofibers of the crystalline polymer filaments themselves in said organic-inorganic hybrid nanofiber.

However, Sakai et al. US 5,750,258 discloses a crosslinked resin-coated silica fine particle (aggregate) using a vinyl-silane coupling agent (see abstract). The vinyl-containing silane coupling agent is made of a silane portion (alkoxysilane similar to applicants disclosure) while using polyethyleneimine as a dispersion stabilizer (Col. 13, Line 37-40). The crosslink coated silica is suitable for controlling the thickness of a liquid crystal layer (crystalline polymer)(Col. 1, Line 6-10). Additionally, using silica allows for improved properties including high hardness and strength (Col. 3, 4, Line 66-67, 1-12).

It would have been obvious to one of ordinary skill in the art to modify Smith using silica covering in order to control the thickness of the polymer filament and produce an aggregate structure. One would have been motivated to use a silica covering in order to improve the hardness and the strength of the material being coated and produce an aggregate. One of ordinary skill would recognize that using a silica covering would provide the attributes of a composite (more than one type of material).

As to Claim 9, Smith discloses the organic-inorganic hybrid structure crystalline polymer filaments themselves are crosslinked by means of a crosslinker (bis-epoxide) (Page, Line 17-20).

Response to Arguments

Applicant's arguments, see remarks, filed 12/08/2009 with respect to claims 1-9 have been fully considered and are persuasive. The previous rejection on 09/30/2009 has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Smith. Smith discloses an organic-inorganic hybrid nanofiber (See under technical field, Line 9-10). The nanofibers are crystalline polymer filaments made of a polymer having a straight-chain polyethyleneimine skeleton (linear polyethyleneimine, see abstract and summary of invention).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GARY D. HARRIS whose telephone number is (571)272-6508. The examiner can normally be reached on 8AM - 5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/
Supervisory Patent Examiner, Art Unit 1794

/G. D. H./Gary Harris
Examiner, Art Unit 1794